MARYLAND & RARE BOOK ROOM
UNIVERSITY OF MARYLAND LIBRARY
COLLEGE PARK, MD.

Digitized by the Internet Archive
in 2015

https://archive.org/details/annualreportofma40mary

The Fortieth Annual Report

OF THE

UNIVERSITY OF MARYLAND

Maryland

Agricultural Experiment Station

College Park, Prince George County, Maryland

Archives
LPUB
A33.001

1926-1927

PUBLISHED BY THE STATION

6262320

CONTENTS

CONTENTS

	Page
Fortieth Annual Report	I
Agricultural Investigations	VII
List of Projects	XXIII
List of Bulletins Published	XXI
List of Bulletins Published for the Fiscal Year	VIII
Contributions to Scientific Meetings and Journals	XIV
Changes in Staff	XV
Land and Buildings	XV
The Contribution of Research to Agriculture	XVI
Financial Statement	XVII
Bulletin No. 283—Pectic Constituents of Peaches and Their Relation to Softening of the Fruit	1
Bulletin No. 284—Fruit Rotting Sclerotinias	9
Bulletin No. 285—Agricultural Progress in a Typical Maryland Community	23
Bulletin No. 286—The Concord Grape	61
Bulletin No. 287—Soil Management Studies	119
Bulletin No. 288—The Salt Requirement of Tobacco Grown in Sand Cultures	133
Bulletin No. 289—The Relative Value of Different Carriers of Phosphorus	155
Bulletin No. 290—The Relations of Internal Cob Discoloration to Yield in Corn	179

UNIVERSITY OF MARYLAND

AGRICULTURAL EXPERIMENT STATION

Volume 40 1926-1927

THE FORTIETH ANNUAL REPORT OF THE MARYLAND AGRICULTURAL EXPERIMENT STATION

For the fiscal year ending June 30, 1927.

By H. J. PATTERSON, Director.

To the Governor of Maryland and the President and Board of Regents of the University of Maryland:

Gentlemen: Since this is the fortieth annual report made by this Station, and is the fortieth anniversary year of the establishment of a national system of agricultural research institutions, a brief historical statement and summary should be of special interest.*

The United States Congress passed March 2, 1887, the Hatch Act making provisions for an agricultural experiment station in every State and Territory. This Act also made provision for $15,000 annually for each State for research work in agriculture and kindred subjects. The Act did not directly carry an appropriation, so it did not become operative until provided for by the 50th Congress by an appropriation Act approved February 2, 1888.

The terms of the Hatch Act were formally assented to and accepted by an Act of the Maryland Legislature approved March 6, 1888. This Hatch Act was supplemented later by Congress by the passage of the Adams Act approved March 16, 1906, providing an additional annual sum of $15,000 for each station, and the Purnell Act, approved February 24, 1925, stipulating that each State should receive $20,000 the first year with increasing annual increments of

---

*A brief history of each department and its activities was prepared, but it proved so voluminous that money was not available for its publication.

$10,000 until the total sum available for each State amounted to $60,000. This maximum will be reached with the fiscal year beginning July 1, 1929.

These three Acts make a total of $90,000 annually provided by the Federal appropriations for agricultural research work.

From 1888 to 1903, the Maryland Station had only the Federal appropriations with which to conduct its work. In 1903, the Maryland Legislature gave the first appropriation ($5,000) to supplement the Federal funds for the Agricultural Experiment Station. This appropriation has been increased from time to time until it reached $66,900 in 1922.

In 1914 the Legislature made an appropriation for the purchase of a sub-station farm at Ridgely, Caroline County, and gave $1,500 annually for its maintenance. This maintenance fund was increased in 1916 to $5,000 annually.

The inauguration of experiment stations was a recognition of the need and desire of farmers for agricultural information which did not exist and which they had neither time, means nor training to procure. This recognition of farm problems and need for their solution first took form in Maryland through the establishment, by the Legislature of 1847, of an agricultural laboratory and the making of provision for research in the charter for the Agricultural College passed in 1856.

The result of the Station's work has been published in annual reports, 290 bulletins, many technical articles in scientific journals and society proceedings, contributions to the popular press and addresses at various farm meetings. The Extension Service also conveys and demonstrates the results of agricultural research to the farmers of the State.

The research work of this Station is reflected in higher average yields and improved quality of all our grain and hay crops; the improvement of the quality of live stock; better returns for the feed consumed by live stock; the introduction of new forage crops, such as alfalfa and soja beans; the solving of many factors which promoted the extension of fruit and vegetable growing; the development of disease resistant strains of plants; the devising of sprays for the control of insects and diseases; the classifying and mapping of the various soil areas in the State making possible an inventory of the soil resources of the State; the working out of better systems of fertilization of crops, and a rational basis for the liming of soils.

These results if interpreted in a money value is bringing to the State annually many times the total cost of the amount expended for agricultural research, education and extension in the forty years since the Station was established.

These results are also reflected in the higher standards of living in the farm homes and in better educational, social and recreational advantages in rural sections. This is as it should be, for in the final analysis, the aim is to make the business of farming profitable in order that there may be established comfortable homes and good social conditions which will maintain and hold a happy and contented rural population.

Not only have the people on the farms benefited by agricultural research, but also every home in village, town and city and every consumer of food.

A review of agricultural conditions will show that substantial progress has been made through scientific research. That little substantial or permanent help has been rendered simply through legislation. Measures which are not economically sound will ultimately result in making the condition which it aims to correct worse instead of better. The present and future problems of the farmer must be solved by research making new solutions, new applications and new discoveries.

The farm problem is one of production, marketing, transportation and distribution. These agencies must unite and co-operate for a satisfactory solution; no one of them can solve it alone.

The idea is frequently expressed that the farmers' problems can be solved by orderly marketing and higher prices. This idea has many fallacies. The farm problem is more than a marketing problem. There never will be a plan devised which will give the farmer a profit who can not produce economically. When the cost of production goes above a certain point there will always be a loss. Research in production and marketing must go hand in hand. They cannot be divorced.

AGRICULTURAL INVESTIGATIONS.

This station aims to investigate and discover information which will help the farmers of Maryland to successfully meet and overcome problems and difficulties so as to place farming on a substantial and profitable basis. The work in hand covers most all phases of creative, productive and protective agriculture. Many surveys and inventories are made which concern rural, economic and social conditions. These surveys aim to acquire facts which will point the way for a more prosperous and contented farm population.

As a rule emphasis is put on matters that might be considered as ministering to the sick.

Insofar as possible investigations are organized around the industry rather than by departments. This means that the various departments are informed as to what other departments are doing with a given crop and they co-operate so that projects supplement one another to a considerable extent.

Many of the experiments are conducted at the points in the State where conditions are most favorable for the work and where the results will be obtained under representative farm conditions. This gives many farmers directly interested in a project, an opportunity to see the tests from time to time. Improved practices will come quicker by seeing than by hearing or reading.

This Station has 187 projects in progress at present. Many of these need more men and money to do them justice. Many problems are presented each year which cannot be taken up at all for lack of funds.

The following is a list of the investigations in progress:

Agricultural Economics:

1. *Economics of the Canning Industry in Maryland:*
    - A. Cost of production of tomatoes, sweet corn and peas.
    - B. Cost of manufacture of tomatoes, sweet corn and peas.
    - C. Cost of distribution of tomatoes, sweet corn and peas.

Agronomy:

1. *Corn:*
    - A. Variety tests for mature corn and silage.
    - B. Corn breeding by selection.
    - C. Hybridization.
    - D. Environmental factors affecting wheat fields.
    - E. European Corn Borer Control—The relation of varieties; planting dates; fertility and cultural methods in control.
2. *Wheat:*
    - A. Variety tests.
    - B. Hybridization.
    - C. Head selection and Head-to-row tests with wheat.
    - D. Environmental factors affecting wheat yields.
    - E. Wheat storage on Maryland farms.
3. *Oats:*
    - A. Variety tests.
    - B. Variety tests winter oats.
4. *Barley:*
    - A. Hybridization for smooth awns on winter barley.
5. *Hay, Forage and Pasture:*
    - A. Tests of seed from different sources for hay, forage and pasture.
    - B. Green manure and soiling crops—rye—vetch, sweet clover.
    - C. The botany and culture of bent grasses.
    - D. Rates of seeding by mixtures.
    - E. Durability of pasture grasses.
    - F. Lawns, grass experiments.
6. *Annual Legumes:*
    - A. Inoculation for legumes.
    - B. Grasses for hay and pasture.
    - C. Variety tests of soybean.
    - D. Soybean hay-making and composition of soybeans.
    - E. Effect of soybeans on wheat yields.
7. *Sugar Corn:*
    - A. Seed production and breeding.
8. *Miscellaneous projects:*
    - A. Crop rotation.
    - B. The effect of genetic equilibrium and selection upon plant breeding practice.
    - C. Lawn grass experiments.
9. *Wormseed:*

Animal Husbandry:

1. Comparison of fish-meal and soybean oil-meal as nitrogenous supplements for brood sows.
2. Experiment in hogging-down of rye.
3. Data obtainable concerning the rates of gain made by pure-bred and by cross-bred pigs.
4. Study of quality of Maryland hams.
5. Comparative study of wether and ram lambs to determine the effect of castration upon the rate and character of production.

Biological Laboratory and Hog Cholera Investigations:

1. Determining the percentage of double-treated hogs that may later become susceptible to cholera; to find the proper age that pigs may be immunized by the double treatment; and length of time immunity of double-treated pigs may be expected to last.
2. Determining the age at which pigs from immune mothers become susceptible to hog cholera.
3. A study of the relation of Ozone to animal diseases.
4. Survey of abortion in Dairy cattle.

Botany—Plant Propagation:

1. *Vegetative plant propagation:*
    - A. Temperature requirements.
    - B. Sand vs. other media for cuttings.
    - C. Moisture requirements.
    - D. Seasonal effects.
    - E. The necessity for leaves on green-wood cuttings.
    - F. Structures from which roots develop.
    - G. Chemicals for stimulating root-growth on cuttings.
    - H. Survey of types of root-growth in different plants with the hope of finding something to help understand the underlying principles.

Canning:

1. Studies of the yielding capacity and the canning qualities of different varieties of tomatoes, spinach, beans and beets.

Dairy Husbandry:

1. Establish a system or method whereby contagious abortion may be regulated and controlled.
2. A study of the cost of milk production.
3. Study of the history and development of Station herd.
4. Effect of the consistency of the ice cream mix at time of drawing from freezer upon the smoothness of ice cream after hardening.
5. Studying the value of adding vanilla flavoring to chocolate ice cream.

Entomology:

1. Biology and control of some greenhouse pests.
2. Repelling stable flies.
3. A study of laspeyresia molesta busck in Maryland.
4. Winter protection of bees.
5. Biology and control of the peach tree borer.
6. Dusting peach and apple trees for the control of insects and diseases.
7. Insecticide investigation. Sub-title: The chemical, physical and insecticidal properties of pine tar creosotes and some allied products.
   Part II. A study of the efficiency of spreaders and stickers.
8. Biology and control of the potato tuber moth.
9. Investigation of the biology and control of insects affecting canning crops.
   Sub-title: Biology and control of the corn-ear worm.
10. Apple insects. Sub-title: Apple plant lice.
11. The head capsule of the soldier termite.
12. Biology of the lesser bee moth.
13. Biology of the larger cabinet beetle.
14. Study of insecticidal roperties of pyrethrum and its products.

FLORICULTURE:

1. *Carnatinos:*
   - A. A study of calyx splitting.
   - B. Effect of soil types on yields of varieties.
2. *Snapdragon:*
   - A. Breeding and selection.
3. *Gladiolus:*
   - A. Effect of time of ripening of bulb on forcing qualities.
5. *Treatment of greenhouse soil in solid beds:*
   - A. Drainage.
   - B. Freezing.
   - C. Drying.
6. Greenhouse crop fertilizers.
7. Dahlia variety testing.

Home Economics:

1. Housing in relation to farm labor turnover.

Plant Pathology (Disease) Investigations:

1. Inspection of orchards and nurseries.
2. Annual plant disease survey.
3. Diseases of carnations.
4. Botanical survey in Maryland.
5. Identification of samples of plants.
6. Fruit rot-sclerotinia.
7. Weed identification and eradication.
8. Varieties resistant to disease.
9. Maryland native grasses.
10. Maryland trees, botany of.
11. Resistance to clover diseases.
12. Tomato leaf spot and other tomato diseases.
13. Wilt resistance of tomatoes.
14. Carnation stem rot.
15. Cabbage disease resistance.
16. Root rot of peas, resistance.
17. Mycosphaerella.
18. Corn root rot.
19. Peach twig canker.
20. Dahlia diseases.
21. Dahlia trial garden.
22. Dusting truck crops for disease.
23. Wheat scab, etc.
24. Tomato mosaic.
25. Tobacco diseases.
26. Blight-restraint spinach.
27. Apple scab.
28. Potato seed and mosaic control.
29. Bean anthracnose control.
30. Spraying and dusting (co-operation.)
31. Effect of chemicals on pollen on heredity.

Plant Physiology:

1. *The rest period in potato tubers*
   - A. Field test on shortening the rest period of Irish cobbler potatoes by treating the seed with ethylene chlorhydrin.
2. *A chemical and physiological study of the "spindling sprout" disease of potatoes:*
3. *Physiological and biochemical aspects of vegetable storage:*
   - A. Physiological and chemical basis for the initial rise in respiration of potatoes after a period of cold storage.

B. Comparison of physiological shrinkage of different varieties of potatoes in storage.

C. Relation of pectic transformation to softening of potatoes in late storage.

D. Physiological and chemical studies on parsnips, beets, turnips, carrots, cantaloupes and tomatoes under different storage conditions. Special emphasis is being placed on respiration in relation to quality and period of storage.

4. *Regeneration in potato tubers:*

A. Law and mechanism of inhibition and correlation in growth of sprouts on potato tubers.

B. Controlling influence of soil atmosphere on sprouting and growth of potatoes.

5. *Metabolism studies in sweet corn:*

A. Polysaccharide changes in sweet corn during maturity with special reference to dextrins.

6. *Physiological aspects of fruit storage:*

7. *A study of the pectic constituents in tomatoes with reference to quality of the canned product:*

Pomology:

1. Fruit spur and biennial bearing studies of apples—Hancock, Md.
2. The effect of shade on horticultural plants. Fruits, vegetables and flowers used—College Park.
3. The effect of varying the length of day on plant growth and chemical composition—College Park.
4. The fertilization of apple orchards—Salisbury, Hancock, Colesville, Berlin and Mt. Airy.
5. The fertilization of peach orchards—Salisbury, Berlin, Mt. Airy and College Park.
6. Sod vs. tillage for apple orchards—Hancock and Colesville.
7. The propagation of apple trees on their own roots—College Park.
8. The fertilization of strawberries—College Park, Ridgely, Salisbury and Marion.
9. The composition of bearing and non-bearing fruit spurs throughout the year—College Park.
10. The effect of bud and spur defoliation on fruit bud formation (peach)—College Park.
11. The influence of pollination on fruit yields—Hancock, College Park and Salisbury.
12. Experiments in grape training and pruning—College Park, Beltsville and Salisbury.
13. The rejuvenation of peach orchards—College Park and Smithsburg.
14. Peach pruning experiments—College Park, Salisbury and Mt. Airy.
15. The breeding of blight resistance pears—College Park.
16. The breeding of early colored grapes—College Park.
17. Variety tests of apples, peaches, pears, plums and cherries—College Park.
18. Variety tests of grapes and strawberries—College Park and Ridgely.
19. Variety tests of bush fruits—College Park.
20. Transplanting studies with trees.
21. Collection of phenological data.
22. Apple breeding and testing of new seedlings.
23. An economic study of peach, cling varieties, for canning.
24. An economic study of peach planting.
25. A study of factors influencing color in apples.
26. A study of the effect of nitrogenous fertilizers on the keeping and shipping qualities of strawberries, peaches and apples.

Poultry Husbandry:

1. *Egg-Laying Competition—Some of the problems being studied in connection with the project are:*
    - A. Relation of body weight to production.
    - B. Difference in feed consumption exhibited by the different strains.
    - C. Studies in problems of management especially in relation to controlling disease by management methods.
2. *Tests of a special method for drying and pulverizing poultry manure as it comes from the dropping boards.*
3. *Designing and testing poultry house appliances.*

Seed Laboratory:

1. Inspection of seeds sold throughout the State each year.
2. Examination of samples taken from seeds sold throughout the State each year.
3. Examination of samples submitted to the laboratory each year.
4. Identification of seeds submitted to the laboratory from time to time.
5. Studies of observed variations among germination tests.
6. Studies of changes in weight of various components of seed samples and the resulting effects on the percentage composition.

Soil and Fertility:

1. Resurvey of soils of certain counties.
2. Analysis of important soil types.
3. Field study of the fertilizer requirements of the important soil types.
4. The lime requirement of Maryland soils.
5. Movement of lime in the soil.
6. A study of the rate of early potato fertilizers on Norfolk soil.
7. Effect of fertilizer treatments upon the quality of tomatoes. (In co-operation with horticulture.)
8. Effect of fertilizer treatments upon the lime requirement.
9. Plant nutrition studies in sand cultures.
10. Field study of concentrated fertilier mixtures. (In co-operation with U. S. D. A.)
11. The effect of soybeans upon the succeeding crop.
12. A study of the organic-inorganic nitrogen ratio for early fertilizer.
13. Field tests of high analysis fertilizers. (In co-operation with U. S. D. A.)
14. Field tests of different carriers of nitrogen. (In co-operation with U. S. D. A.)
15. Effect of growing plants upon the reaction of the nutrient solution.

Tobacco Investigations:

1. Tobacco breeding and variety tests.
2. Crop rotation tests with tobacco.
3. Effects of crops on yields of succeeding crops in the rotation, with special reference to tobacco.
4. Fertilizer tests and studies in the nutrition requirements of the tobacco plant, with reference to both quality and yield of leaf tobacco.
5. Improved methods of handling seed beds, including steam sterilization.

Vegetable Gardening:

1. *Potatoes:*
    - A. Variety experiments with especial relation to a good late variety.
    - B. Time of planting late potatoes—Belair, Marion and College Park.
2. *Cabbage and cauliflower:* .
    - A. Methods of growing seed of especially adapted varieties.
    - B. Conditions affecting heading of late crop of cauliflower in southern sections of State—Ridgely and College Park.
    - C. Study of hardiness of early Jersey Wakefield and Charleston Wakefield and possible bearing it may have on formation of seed shoots—College Park.

    - D. Selection of mid-season "yellows" resistant strains best suited to Maryland—College Park.
3. *Garden peas:*
    - A. Fertilizers.
    - B. Rate of seeding.
    - C. Best crop to precede.
    - D. Rotation of crops with and without legumes as affecting diseases.
    - E. Inoculation experiments with peas.
    - F. Influence of temperature on the growth of peas—Ridgely and College Park.
    - G. Factors influencing yield and quality of canning peas.
4. *Rhubarb:*
    - A. Chemical fertilizers with especial reference to sulphate of ammonia—College Park and Chillum.
5. *Cantaloupes:*
    - A. Breeding and selection.
    - B. Manures vs. fertilizers.
    - C. Pollination influence.
6. *Sweet potatoes:*
    - A. Fertilizers—best nitrogen and potash carriers.
    - B. Lime influence—Salisbury and Cheltenham.
7. *General Fertility problems:*
    - A. Amounts of manures and fertilizers to keep soil fertile for vegetable production.
    - B. Effect of continued applications of potash salts.
    - C. Effects of rye as a Winter cover for early Spring plowing and same for later work.
8. *Testing new varieties and strains of vegetables:*
9. *A study of Maryland vegetables as to varieties, cultural methods and marketing:*
10. *Asparagus:*
    - A. Effects of potash on yield and quality.
    - B. Comparison of Spring and Summer application of commercial fertilizers.
11. *Spinach:*
    - A. The development of blight-resistant strain.
    - B. Suitable for market and canning.
12. *Tomatoes:*
    - A. Breeding, selection of varieties for canning.
    - B. Cultural methods.

PUBLICATIONS.

The results secured during the year have been given in the bulletins and articles listed below:

	Pages
No. 283. Pectic Constituents of Peaches and Their Relation to Softening of the Fruit By C. O. Appleman and C. M. Conrad.	1-8
No. 284. Fruit-Rotting Sclerotinias III. Longevity of Buried Brown-Rot Mummies. By Walter N. Ezekiel.	9-22
No. 285. Agricultural Progress in a Typical Maryland Community By J. E. Metzger.	23-60
No. 286. The Concord Grape—Pruning and Chemical Studies in Relation to the Fruiting Habits of the Vine By A. Lee Schrader.	61-118
No. 287. Soil Management Studies A Three-Year Rotation for Western Maryland. By A. G. McCall.	119-131

No. 288. The Salt Requirements of Tobacco Grown in Sand Cultures.. 132-153
By Ho Liu.
No. 289. The Relative Value of Different Carriers of Phosphorus...... 154-177
By A. G. McCall.
No. 290. The Relation of Internal Cob Discoloration to Yield in Corn.. 178-196
By R. A. Jehle, F. W. Oldenburg and C. E. Temple.
Thirty-ninth Annual Report—1925-26.................................. 1-16
By H. J. Patterson.

CONTRIBTIONS TO SCIENTIFIC MEETINGS AND JOURNALS.

Department of Animal Pathology:

"Pyocyaneus Bacillosis and Mastitis Due to Pseudomonas Aeruginosa." Cornell Veterinarian, July, 1926, page 186.

Department of Dairy and Animal Husbandry:

"Effect of Overrun and Temperature on Dipping Losses in Ice Cream. Ice Cream and Trade Journals, July and Aug. nos., 1926.

Department of Entomology:

"Laspeyresia Molesta as an Apple Pest," by E. N. Cory and H. S. McConnell. Jr. of Enonomic Entomology. Vol. XX, p. 190. Feb. 1927.

"Oriental Fruit Moth Injury to Apples" and "Sprays for Aphis Control for 1927," by E. N. Cory. Md. Agr. Soc. Report. Vol. XI.

"Method of Determining Summer Emergence of Codling Moth Under Field Conditions," by P. D. Sanders. Md. Agr. Soc. Report. Vol. XI, p. 201.

"How Will Vegetable Growing in Maryland Be Affected by the Mexican Bean Beetle, Japanese Beetle and European Corn Borer?" by E. N. Cory. Md. Agr. Soc. Report. Vol. XI, p. 391.

"Notes on the Distribution of Hesperiidae in Western Massachusetts," by H. H. Shepard. Entomological News. Vol. XXXVII, p. 319. Dec. 1926.

"Teaching Elementary Entomology in the United States and Canada," by Paul Knight. Entomological News. Vol. XXXVII. pp. 144-148. 1926.

"Insects: Our Friends and Enemies," by Paul Knight. Maryland Conservationist. Winter issue, 1926.

"The Insect World," by Paul Knight. Maryland Conservationist. Summer issue, 1927.

Department of Horticulture:

"The Effect of Shade on the Growth, Fruit Bud Formation and Chemical Composition of Apple Trees," by E. C. Auchter and A. L. Schrader. Rept. International Botanical Congress, Ithaca, N. Y., August, 1926.

"Does Fruit Thinning Increase Profits?" by E. C. Auchter and W. E. Whitehouse. In "Fruits and Gardens," official magazine of American Pomological Society. June, 1927.

"The Latest Facts on Apple Pollination," by E. C. Auchter. Proceedings New Jersey State Hort. Soc., January, 1927.

"New Developments in Pruning Peach Trees," by E. C. Auchter. Proc. Peninsula Horticultural Soc. March, 1927.

"The Effect of Shade on the Growth, Fruit Bud Formation and Chemical Composition of Apple Trees," by E. C. Auchter, A. L. Schrader and W. W. Aldrich. Proceedings Amer. Soc. Hort. Sci. pp. 368-383. 1926.

"Does Fruit Thinning Pay?" by E. C. Auchter. Rept. Md. State Hor. Soc. January, 1927. pp. 173-183.

"The Future of the American Society for Horticultural Science," by E. C. Auchter. Proc. Amer. Soc. Hort. Sci. pp. 390-402. 1926.

"Influence of Temperature Upon Growth and Yield of Garden Peas," by V. R. Boswell. Proc. Amer. Soc. Hort. Sci. pp. 162-168. 1926.

"Cross-pollination Studies With the Delicious Apple," by W. E. Whitehouse and E. C. Auchter. Proc. Amer. Soc. Hort. Sci. pp. 157-162. 1926

"The Effect of Heavy vs. Light Pruning on Greenhouse Roses," by T. H. White. Proc. Amer. Soc. Hort. Sci. pp. 168-171. 1926.

"Is Light Pruning Better Than Heavy Pruning for Greenhouse Rose?" by T. H. White. Florists' Exchange for June 1, 1927.

"Experimental Results on the Fertilizing of Asparagus," by T. H. White. Proc. Md. Vegetable Growers' Assn. January 5, 1927.

"Results of Pruning and Fertilizer Demonstrations in Maryland," by A. F. Vierheller. Proc. Amer. Soc. Hort. Sci. pp. 363-368. 1926.

'The Identification of Fruit Tree Varieties in the Nursery by Means of Foliage and Wood Characters," By W. H. Upshall. Rept. Md. State Hort. Soc. 1926. Pp. 245-250.

Department of Plant Physiology:

"A Chemical and Physiological Study of Maturity in Potatoes," by C. O. Appleman and E. V. Miller. Jr. Agr. Res. 35:569-577. 1926.

"A Plant Photometer," by E. S. Johnston. Plant Physiology Vol 1, No. 1. 1926.

"Biochemical Study of Insoluable Pectic Substances in Vegetables," by C. M. Conrad. Amer. Jour. of Bot. 13:531-547. 1926.

"An Apparatus for Controlling the Flow of Nutrient Solutions in Plant Culture," by E. S. Johnston. Plant Physiology 2:213-215. 1927.

"Report of Committee on Physiological Investigations," by C. O. Appleman. Proceedings of the Potato Assoc. of America. 1925-1926.

"Percentage of Carbon Dioxide in Soil Air," by C. O. Appleman. Soil Sci. 1927.

"The Physiology of Vegetables in Relation to Their Quality and Food Value," By C. O. Appleman. Symposium, American Chemical Society, Richmond. 1927.

"Reviews in Biological Abstracts," by C. O. Appleman.

"Reviews in Biological Abstracts," by C. M. Conrad.

Department of Soils:

"Soil Acidity Phosphate Ion," by Dr. R. R. McKibbin, given at the International Soil Convention.

CHANGES IN STAFF.

Dr. A. G. McCall, Chief of the Soil Investigations, resigned to accept the position of Chief of the Division of Soils, United States Department of Agriculture. He had been with this Station for ten years. He made many valuable contributions on soils and fertilizers during this period. His services were highly satisfactory to all concerned. We were sorry not to have Dr. McCall continue with us, but our Station feels complimented that they could furnish the successor for Dr. Milton Whitney, who had been taken from this Station when the Soil Division was created in the United States Department of Agriculture.

Dr. R. R. McKibbin, Assistant in Soil Chemistry, resigned to accept the position of Chemist at McDonald College, Canada.

Harlow Bierman and Samuel H. Harvey both resigned from the Dairy Department to engage in commercial work.

J. W. Van Vleit, D.V.M., resigned as Assistant Animal Pathologist, and H. M. DeVolt, D.V.M., was appointed to the vacancy.

LAND AND BUILDINGS

The conditions mentioned in the last annual report continue to grow more acute each year. It is very essential for the proper development of the investigational work that more land be procured.

THE CONTRIBUTION OF RESEARCH TO AGRICULTURE

The Value of Investigations.

It is difficult to place a money value on agricultural research or determine the extent to which results are applied.

Results are valuable only to the extent to which they are used. However, some results which ultimately prove very valuable may remain dormant for many years, and some of the very fundamental and most useful research may have only an indirect value by establishing principles which form the basis for other research which has a more direct and immediate application.

Some results of a more or less negative character are very valuable, though frequently not recognized. Results of this character prevent mistakes and losses. It is frequently just as valuable to know what not to do as to know what to do. The survey and research which prevented the farmers of Maryland from investing money in establishing their own grain elevator in Baltimore was of this character, and probably saved them about one million dollars. The breeding work with grain and canning crops has increased yields and quality sufficiently to give annual returns worth several million dollars.

Methods for the control of insects and plant diseases have prevented great annual losses to farmers and fruit growers. Research on soils and fertilizers has improved the quality of fertilizers, caused a more intelligent use of fertilizers and given information concerning the adptability of soils to crops and the soil resources of this State which has immeasurable value. Research in Dairy Husbandry has been influential in better feeding and dairy practices which are resulting in increased production per cow and higher quality of product. This is beneficial to both producers and consumers. The recent investigations on the dipping losses in ice cream should render a large annual saving to manufacturers. Feeding experiments with swine have pointed the way to more economical pork production. The investigations with poultry have been very helpful in promoting better practices.

The extent and higher development of fruit-growing in Maryland owes much to the investigations in this field.

The soil represents the largest natural resource in this State. Research has done much to develop this resource and make farming more profitable and make possible higher standards of living on the farms and rural communities.

The results of agricultural research is now paying big annual dividends on the amount expended. The solution of present and future farm problems will be helped in a more substantial way by research than by any other agency. Maryland would find it profitable to provide more liberally for research in agriculture.

MARYLAND AGRICULTURAL EXPERIMENT STATION
STATION FARM ACCOUNT

Dr.	
Balance July 1, 1926	$ 1,247.83
Receipts 1926-27	25,610.12
	$26,857.95
Cr.	
By Salaries	3,369.27
Labor	9,858.66
Stationery and Office Supplies	146.02
Scientific Supplies	48.13
Feeding Stuffs	1,716.51
Sundry Supplies	1,735.08
Communication Service	102.27
Travel Expenses	323.10
Publications	181.00
Heat, Light and Power	483.35
Furniture, Furnishings and Fixtures	11.45
Library	4.50
Scientific Equipment	33.31
Live Stock	411.39
Tolls, Machinery and Appliances	607.29
Buildings and Land	3,321.13
Contingent Expenses	107.73
Transportation of Things	212.50
	$22,672.69
Balance June 30, 1927	4,185.26
	$26,857.95

MARYLAND AGRICULTURAL EXPERIMENT STATION IN ACCOUNT WITH UNITED STATES APPROPRIATIONS

Dr.	Hatch Fund	Adams Fund	Purnell Fund
To appropriations for fiscal year 1926-1927	$15,000.00	$15,000.00	$30,000.00
Cr.			
By Salaries	$14,375.39	$13,647.50	$22,014.99
Labor	535.00	....	1,492.89
Stationery and Office Supplies	....	1.40	44.36
Scientific Supplies	8.71	347.17	73.84
Sundry Supplies	31.37	46.43	449.50
Fertilizers	....	....	16.49
Communication Service	2.54	7.23	73.08
Travel Expense	....	....	2,898.30
Transportation of Things	....	....	83.64
Publications	....	....	14.00
Heat, Light, Water and Power	31.08	72.71	....
Furniture, Furnishings and Fixtures	5.20	775.40	873.32
Library	7.50	....	69.58
Scientific Equipment	....	73.35	670.24
Live Stock	....	....	283.00
Tools, Machinery and Appliances	3.41	28.81	63.09
Buildings and Land	....	....	874.68
Contingent	....	....	5.00
Totals	$15,000.00	$15,000.00	$30,000.00

MARYLAND AGRICULTURAL EXPERIMENT STATION IN ACCOUNT WITH THE STATE APPROPRIATIONS

Dr.	General Fund	Ridgely Farm
Balance July 1, 1926	....	$100.15
Receipts for year 1926-27	$73.645.53	$5,589.92
	$73,645.53	$5,690.07
Cr.		
By Salaries	$26,821.71	1,800.00
Labor	14,705.48	1,979.92
Stationery and Office Supplies	390.37	......
Scientific Supplies	409.41	......
Feeding Stuffs	8,745.14	......
Sundry Supplies	1,804.89	476.49
Fertilizers	1,468.05	260.74
Communication Service	334.82	37.97
Travel Expenses	1,746.85	436.01
Transportation of Things	894.34	12.20
Publications	2,128.93	198.15
Heat, Light, Water and Power	1,394.31	14.78
Furniture, Furnishings and Fixtures	649.06	......
Library	384.59	......
Scientific Equipment	383.91	......
Live Stock	290.00	......
Tools, Machinery and Appliances	5,067.82	43.45
Buildings and Land	1,596.39	119.10
Contingent Expenses	1,078.97	......
	$70,295.04	$5,378.81
Overdraft July 1, 1926	5,999.82	......
	$76,294.86	......
Overdraft June 30, 1927	2,649.33*	......
Cr. Balance June 30, 1927	....	311.26
	$73,645.53	$5,690.07

---

*Due from State Treasurer.

MARYLAND AGRICULTURAL EXPERIMENT STATION IN ACCOUNT WITH REGULATORY AND SERVICE FUNDS

Dr.	Biological Laboratory	Seed Inspection
Receipts for the year 19726-1927	$14,256.40	$8,529.40
Cr.		
By Salaries	$6,490.61	$6,911.67
Labor	1,260.00	......
Stationery and Office Supplies	104.20	169.96
Scientific Supplies	1,205.78	124.78
Feeding Stuffs	147.15	......
Sundry Supplies	3,929.00	196.35
Communication Service	580.91	76.57
Travel Expenses	4.00	505.89
Transportation of Things	318.40	1.00
Heat, Light, Water and Power	970.22	......
Furniture, Furnishings and Fixtures	15.48	305.05
Library	....	17.84
Scientific Equipment	134.66	89.78
Live Stock	10.00	......
Tools, Machinery and Appliances	309.72	155.61
Buildings and Land	263.45	......
Contingent Expenses	56.69	5.00
	$15,800.27	$8,559.50
Overdraft July 1, 1926	1,102.10	636.94
	$16,902.37	$9,196.44
Overdraft June 30, 1927	*2,645.97	*667.04
	$14,256.40	$8,529.40

---

*Due from State Treasurer.

BULLETIN-SUBJECT INDEX

	Bulletin Number
Agricultural Progress	285
Barley	28, 35, 56, 20
Basic Phosphate Rock	260
Beef Cattle	22, 36, 121
Bees	154
Clover, Sweet	253
Corn, Field	3, 20, 25, 33, 41, 46, 62, 106, 141, 165, 190, 237, 290
Corn Sweet	86, 120, 290
Crops, Field	281
Dairy Cows	47, 69, 84, 95, 104, 169, 177, 181, 187, 217
Dairy Products	64, 77, 86, 88, 94, 95, 97, 102, 135, 136, 181, 184, 217, 293
Dehorning	78
Diseases, Animal	53, 76, 80, 139, 145, 174
Diseases, Plant	32, 50, 58, 60, 74, 90, 108, 143, 147, 156, 192
Double Blooms of Stocks	259
Drainage	186, 295
Emmer	200
Experiment Station, General	1
Feeds and Feeding Experiments	8, 20, 22, 36, 41, 43, 51, 63, 69, 84, 98, 117, 150, 168
Fence Posts	163
Fertiliezrs, General	6, 24, 27, 30, 34, 37, 40, 45, 49, 52, 68, 89, 91, 114, 199, 202, 214, 225, 247, 294
Fertilizers, Horticulture	126, 151, 215, 222
Floriculture	208, 239
Fruit-Rotting Sclerotinias	256, 271, 284
Fruits, Small	9, 13, 15, 17, 25, 33, 116, 124, 160, 182, 211, 236, 250
Fruits, Tree	4, 5, 42, 72, 82, 92, 125, 130, 144, 159, 176, 178, 196, 207, 218, 255, 278, 283.
Greenhouse Management	81, 119, 127, 158, 205, 206, 222, 245
Hay	35, 85, 118, 194, 202, 228
Insects	16, 23, 38, 55, 57, 58, 59, 73, 87, 101, 109, 111, 115, 123, 131, 134, 137, 140, 142, 148, 149, 152, 161, 175, 176, 206, 208, 209, 213, 223, 236, 239, 241, 252, 262, 264, 269, 272, 292
Lime	56, 66, 110, 166, 193, 242
Legumes, Wild	100
Oats	35, 56, 200
Phosphorus	289
Plant Physiology	183, 191, 212, 254, 255, 265, 267, 270, 276, 283

BULLETIN-SUBJECT INDEX

Bulletin Number
Potatoes, Sweet 18, 59, 60
Potatoes, White (Irish) 2, 17, 25, 31, 38, 46, 62, 108, 132, 167, 172, 183, 204, 212, 215, 251, 265, 270, 276, 282
Poultry 138, 146, 153, 157, 171, 221, 226, 230, 231, 233, 234, 235, 244, 273, 274, 279
Roadside Markets 280
Seed Inspection 170, 189, 197, 203, 210, 219, 220, 224, 229, 238, 243, 249
Seed Investigation 128, 162, 179, 216, 240
Silo Experiments 129
Soils 21, 29, 44, 70, 268, 287, 296
Soy Beans 201, 237, 277
Speltz 200
Sprays and Insecticides 39, 65, 71, 75, 99, 105, 107, 112, 143, 164, 261, 262, 263
Stable Manure 7, 122, 126, 128, 266
Swine 12, 63, 150, 174, 185, 227
Tobacco 26, 67, 103, 188, 225, 275, 288
Tomatoes 11, 19, 25, 54, 113, 173, 180, 192, 204, 248, 291
Vegetables 33 61, 74, 83, 93, 116, 133, 195, 199, 204, 232, 258, 263
Washing Powders 79
Weeds, Maryland 155
Wheat 10, 14, 16, 28, 35, 56, 58, 62, 147, 198, 237. 246
Woody Plants 257

BULLETINS PUBLISHED BY THE UNIVERSITY OF MARYLAND AGRICULTURAL EXPERIMENT STATION.

1 TO 296.

Bulletin No.	Annual Report No.	NAME OF BULLETIN
1	S.V.**	History, Organization and Work of the Station ....Alvord, 1888
2	S.V.	Cutting Seed Potatoes for Planting...........Alvord-Bishop, 1888
3	S.V.	Fodder-Corn and Fodder-Cane.....................Alvord, 1889
4	S.V.	Experiment Orchard...............................Bishop, 1889
5	S.V.	Experiment Orchard...............................Alvord, 1889
6	S.V.	Commercial Fertilizers..................Alvord-Patterson, 1889
7	S.V.	Farm Manures.....................................Alvord, 1889
8	S.V.	Some Feeding Trials.....................Alvord-Hayward, 1890
9	S.V.	Strawberries ....Bishop, 1890
10	S.V.	Wheat ....Hayward, 1890
11	S.V.	Tomatoes ....Bishop-Patterson, 1890
12	S.V.	Pig Feeding ....Alvord-Hayward, 1891
13	S.V.	Strawberries ....Robinson, 1891
14	S.V.	Wheat ....Hayward, 1891
15	S.V.	Experiment Vineyard ....Alvord, 1891
16	S.V.	Wheat Insects ....Doran, 1892
17	S.V.	Strawberries and Seed Potatoes..........Brinkley-Robinson, 1892
18	S.V.	Sweet Potatoes................................Brinkley, 1892
19	S.V.	Tomatoes ....Robinson, 1892
20	S.V.	The Composition and Digestibility of the Different Parts of Corn Fodder..................Patterson, 1893
21	S.V.	The Soils of Maryland...........................Whitney, 1893
22	S.V.	Steer Feeding.....................................Miller, 1893
23	S.V.	Injurious Insects of Maryland......................Riley, 1893
24	S.V.	Composition of Commercial Fertilizers........Chem. Dept., 1894
25	S.V.	Agricultural and Horticultural Departments— Corn, Potatoes, Tomatoes, Strawberries, Grapes, etc. ....Miller-Brinkley, 1894
26	S.V.	Tobacco ....Patterson, 1894
27	S.V.	Composition of Commercial Fertilizers sold in this State ....Chem. Dept., 1894
28	S.V.	Experiments with Wheat and Barley.........Miller-Brinkley, 1894
29	S.V.	Further Investigations of the Soils of Maryland. Whitney-Key, 1894
30	8	Composition of Commercial Fertilizers sold in this State ....Chem. Dept., 1895
31	8	Potato Experiments........................Miller-Brinkley, 1895
32	8	The San Jose Scale.................................Riley, 1895
33	8	Horticulture and Agricultural Departments— Small Fruits, Vegetables and Corn.............Robinson, 1895
34	8	Composition of Commercial Fertilizers..........Chem. Dept., 1895
35	8	Wheat, Barley, Oats and Hay Experiments...Miller-Brinkley, 1895
36	8	Steer Feeding.................................Miller-Brinkley 895
37	9	Composition of Commercial Fertilizers sold in this State ....Chem. Dept., 1896
38	9	Potato Experiments ....Miller-Brinkley, 1895
39	9	Spray Calendar ....Miller, 1896
40	9	Composition of Commercial Fertilizers..........Chem. Dept., 1896
41	9	Test of Methods of Preparing and Feeding Corn Fodder ....Patterson, 1896

**Special Volume.—Bulletins 1 to 30, 1888 to 1895, may be found in a special bound volume, a copy of which is in the College Library.

BULLETINS PUBLISHED BY THE UNIVERSITY OF MARYLAND AGRICULTURAL EXPERIMENT STATION.—Continued.

Bulletin No.	Annual Report No.	NAME OF BULLETIN
42	9	The Maryland Trees and Nursery Stock Law and Other Information of Special Interest to Nurserymen and Fruit Growers....Johnson, 1896
43	9	Report Upon the Value of New Corn Product....Patterson, 1896
44	9	The Soils of the Hagerstown Valley....Dorsey, 1896
45	10	Composition of Commercial Fertilizers....Chem. Dept., 1897
46	10	Corn and Potato Experiments....Miller-Brinkley, 1897
47	10	Dairy Farming....Patterson, 1897
48	10	Some Common Injurious Plant Lice, with Suggestions for Their Destruction....Johnson, 1897
49	10	Composition of Commercial Fertilizers....Chem. Dept., 1897
50	11	Rust and Leopold Spot, Two Dangerous Diseases of Asparagus....Johnson, 1897
51	11	Horse Feeding....Patterson, 1897
52	11	Composition of Commercial Fertilizers....Chem. Dept., 1898
53	11	Special Investigation of the So-Called "New" Horse Disease in Maryland....Buckley, 1898
54	11	Tomatoes....Robinson, 1898
55	11	The Black Peach Aphis——Cut-Worms in Young Tobacco——Law Providing for the Suppression and Control of Insect Pests and Plant Diseases in Maryland....Johnson, 1898
56	11	Wheat, Winter Oats, Barley and Lime Experiments....Miller-Brinkley, 1898
57	12	Report on the San Jose Scale in Maryland and Remedies for Its Suppression and Control....Johnson, 1898
58	12	The Hessian Fly and Wheat Diseases....Johnson, 1898
59	12	Sweet Potato Insects....Sanderson, 1899
60	12	Sweet Potato Diseases....Townsend, 1899
61	12	The Sugar Beet in Maryland....Wiley, 1899
62	12	Experiments with Wheat, Corn and Potatoes....Patterson, 1899
63	13	Experiments with Feeding Pigs....Patterson, 1899
64	13	A Study of the Cause of Mottled Milk....Doane, 1900
65	13	Insecticides, Fungicides and Spraying Apparatus. Johnson-Townsend-Gould, 1900
66	13	Lime Sources and Relation to Agriculture....Patterson, 1900
67	13	The Culture and Handling of Tobacco....Patterson, 1900
68	14	Fertilizer Experiments with Different Sources of Phosphoric Acid....Patterson, 1900
69	14	The Influence of Feed and Care on the Individuality of Cows....Doane, 1900
70	14	The Chemical Composition of Maryland Soils....Veitch, 1901
71	14	Notes on Spraying Peaches and Plums in 1900 Townsend-Gould, 1901
72	14	Peach Growing in Maryland....Gould, 1901
73	14	Suggestions About Combating the San Jose Scale....Gould, 1901
74	14	Notes on Celery Blight....Townsend, 1901
75	14	The Effect of Hydrocyanic-Acid Gas Upon Grains and Other Seeds....Townsend, 1901
76	14	Parturient Paresis—Milk Fever, Calving Fever....Buckley, 1901
77	15	The Comparative Digestibility of Raw, Pasteurized and Cooked Milk....Doane-Price, 1901

BULLETINS PUBLISHED BY THE UNIVERSITY OF MARYLAND AGRICULTURAL EXPERIMENT STATION.—Continued.

Bulletin No.	Annual Report No.	NAME OF BULLETIN
78	15	The Dehorning of Stock....Doane, 1901
79	15	The Disinfectant Properties of Washing Powders....Doane, 1901
80	15	Acute Epizootic Leucoencephalitis in Horses MacCullum-Buckely, 1902
81	15	Soils and Fertilizers for Greenhouse Crops..Patterson-White, 1902
82	15	Thinning Fruits....Sandsten, 1902
83	15	Investigation as to the Cause of Pithiness in Celery....Sandsten-White, 1902
84	15	Some Feeding Experiments with Cows and Tables for the Computation of Rations for Farm Animals....Patterson, 902
85	16	Alfalfa for Maryland....Taliaferro, 1902
86	16	The Influence of Preservatives Upon the Food Value of Milk....Doane-Price, 1902
87	16	The Periodical Cicada or Seventeen-Year Locust Quaintance, 1902
88	16	Economincal Methods for Improving the Keeping Qualities of Milk....Doane, 1903
89	16	Experiments with Potash as a Fertilizer....Patterson, 1903
90	17	The San Jose Scale....Symons, 1904
91	17	Experiments with Nitrogenous Fertilizers....Patterson, 1904
92	17	Notes on Apple Culture....Austin, 1904
93	17	Second Report on the Pithiness of Celery....Austin-White, 1904
94	18	Systems for Keeping Milk and Butter Records....Doane, 1904
95	18	The Character of Milk During the Period of Heat....Doane, 1904
96	18	Sweet Corn....Stabler, 1904
97	18	The Relative Profits of Selling Milk, Cream and Butter....Doane, 1904
98	18	Home-Grown Protein as a Substitute for Purchased Feeds and Tests of Soiling Crops....Doane, 1904
99	18	Spray Solutions for San Jose Scale....Symons, 1904
100	18	The Wild Legumes of Maryland....Norton-Walls, 1905
101	18	Common Injurious and Beneficial Insects of Maryland....Symons, 1905
102	18	Leucocytes in Milk and Their Significance....Doane, 1905
103	18	Method of Tobacco Seed Selection....Cobey, 1905
104	19	Tests of Material for Bedding Cows....Doane, 1905
105	19	Fumigating Nursery Stock....Symons-Gahan, 1905
106	19	The Influence of the Size of the Grain and the Germ of Corn Upon the Plant....Walls, 1905
107	19	1905—Spraying Experiments for San Jose Scale. Symons-Gahan, 1905
108	19	Irish Potato Diseases....Norton, 1906
109	19	Mosquitoes....Symons-Coffin-Gahan, 1906
110	20	Investigations on the Liming of Soils....Patterson, 1906
111	20	The Oyster-Shell Scale....Symons, 1906
112	20	Treating San Jose Scale....Symons-Gahan, 1906
113	20	Tomato Investigaiton....White-Ballard 1906
114	20	Fertilizer Experiments with Different Sources of Phosphoric Acid....Patterson, 1907
115	20	Control of Insect Pests and Diseases of Maryland Crops....Norton-Symons, 1907

BULLETINS PUBLISHED BY THE UNIVERSITY OF MARYLAND AGRICULTURAL EXPERIMENT STATION.—Continued.

Bulletin No.	Annual Report No.	NAME OF BULLETIN
116	20	Marketing Fruit and Truck Crops.................... Hutt, 1907
117	20	Molasses Feeds. .... Patterson-Outwater, 1907
118	20	Alfalfa in Maryland................................ Nash, 1907
119	21	Greenhouse Pests in Maryland...................... Gahan, 1907
120	21	Sweet Corn Investigations...................... Straughn, 1907
121	21	The Beef-Cattle Industry in Maryland............... Porter, 1907
122	21	Stable Manure Experiments............ Taliaferro-Patterson, 1907
123	21	San Jose Scale and the Peach Lecanium..... Symons-Weldon, 1907
124	21	Strawberries .... Close-Ballard-White, 1907
125	21	Nut Growing in Maryland........................... Close, 1908
126	21	Manuring and Fertilizing Truck Crops.......... Close-White, 1908
127	21	Miscellaneous Greenhouse Notes........ Close-White-Ballard, 1908
128	21	The Effect of Animal Digestion and Fermentation of Manure on the Vitality of Seeds....... Oswald, 1908
129	22	Silos and Silage in Maryland................ Crisp-Patterson, 1908
130	22	Nurseries and Nursery Inspection........... Symons-Norton, 1908
131	22	Treatment for San Jose Scale..................... Symons, 1908
132	22	Irish Potato Investigations................... Close-White, 1909
133	22	Cabbage Experiment and Culture............... Close-White, 1909
134	22	The Brown-Tail Moth—The House Fly—The Mosquito .... Symons, 1909
135	22	Butter-Making in Maryland........................ Melick, 1909
136	22	Whipped Cream.................................... Melick, 1909
137	23	The Angoumois Grain Moth......................... Symons, 1909
138	23	The Poultry Industry in Maryland .... Opperman, 1909
139	23	Nodular Tæniasis, or Tapeworm Disease of Fowls .... Gage-Opperman, 1909
140	23	The San Jose Scale and the Osage Orange Hedge .... Symons-Peairs, 1909
141	23	Corn—Variety Tests—Seed Breeding, Selection and Testing. .... Nash, 1910
142	23	The Codling Moth.......................... Symons-Peairs, 1910
143	23	Plant Diseases and Spray Calendar.......... Norton-Norman, 1910
144	23	Apple Culture .... Close, 1910
145	23	Tuberculosis of Animals.......................... Buckley, 1910
146	24	Poultry House Construction and Its Influence on Domestic Fowls.............................. Opperman, 1910
147	24	Wheat—Variety Tests; Wheat—Smuts and Scabs—.. Schmitz, 1910
148	24	Spraying, Fumigating and Dipping for the Control of the San Jose Scale.......... Symons-Peairs-Cory, 1910
149	24	The Terrapin Scale.......................... Symons-Cory, 1910
150	24	Pig Feeding Experiments and Two Kinds of Hog Houses .... Stabler, 1911
151	24	Fertilizers on Asparagus............... Close-White-Ballard, 1911
152	24	Aphidiinæ of North America........................ Gahan, 1911
153	24	Bacteria and Animal Organisms Found in the Feces and Intestinal Mucosa of Healthy Chickens .... Gage, 1911
154	24	Bee-Keeping in Maryland........................... Symons, 1911
155	25	Maryland Weeds and Other Harmful Plants........ Norton, 1911
156	25	Rose Mildew................................ White-Norton, 1911
157	25	Some Experiments with Poultry.................. Opperman, 1911

BULLETINS PUBLISHED BY THE UNIVERSITY OF MARYLAND AGRICULTURAL EXPERIMENT STATION.—Continued.

Bulletin No.	Annual Report No.	NAME OF BULLETIN	
158	25	Miscellaneous Greenhouse Experiments	Close-White, 1911
159	25	Peach Culture	Close-Ballard, 1911
160*	25	Strawberries	White-Close-Ballard, 1911
161*	25	Treatment for the San Jose Scale and Terrapin Scale Insects	Symons-Cory-Babcock, 1911
162*	25	The Quality of Seed	Norton, 1911
163*	25	Increasing the Durability of Fence Posts	Besley, 1912
164*	25	Lime-Sulfur as a Summer Spray	Norton-Symons, 1912
165*	25	Boys' Corn-Growing Contest in 1911	Hanger-Schmitz, 1912
166	25	How Is Lime Distributed Through and Lost from Soil?	Broughton, 1912
167	25	Changes in Irish Potatoes During Storage	Appleman, 1912
168	26	By-Product Feeds	Patterson-White, 1912
169*	26	Cow Testing Association	Hibbard-Wolcott, 1912
170*	26	The Maryland Seed Law	Smith, 1912
171	26	Poultry Notes	Waite, 1912
172*	26	Irish Potato Investigation in 1909-1913	White, 1913
173*	26	Tomato Variation Induced by Culture	White, 1913
174*	26	Hog Cholera	Bolton, 1913
175*	26	Miscellaneous Insect Pests	Symons-Cory, 1913
176	26	Peach Tree Borer	ach Tree Borer
177*	26	Open Stable Versus Closed Stable for Dairy Animals	Buckley, 1913
178*	27	Apple Orchard Experiments	Ballard, 1913
179*	27	Clover and Vetch Seed Sold in Maryland	Smith, 1914
180	27	Tomato Variety and Planting Test	White, 1914
181*	27	Inexpensive Aids in Producing Sanitary Milk	Lamson, 1914
182	27	Experiments with Small Fruits	Ballard, 1914
183	27	Study of Rest Period in Potato Tubers	Appleman, 1914
184	27	Curd as an Index of the Food Value of Milk	Buckley, 1914
185	28	The Maryland Hog	Opperman, 1914
186	28	Land Drainage in Maryland	Haswell, 1914
187*	28	Profitable and Unprofitable Cows	Wolcott, 1914
188*	28	Types and Varieties of Maryland Tobacco	Brown-Garner, 1914
189	28	Grass and Rape Seed Inspected in 1913	Smith, 1915
190*	28	Test of Varieties of Corn	Hanger, 1915
191	29	Relations of Catalase and Oxidases to Respiration in Plants	Appleman, 1915
192	29	Internal Action of Chemicals on the Resistance of Tomatoes to Leaf Diseases	Norton, 1916
193*	29	Test of the Availability of Different Grades of Ground Limestone	Broughton-Williams-Frazee, 1916
194*	29	Sudan Grass	Schmitz, 1916
195*	29	Onions	White, 1916
196*	29	Methods and Problems in Pear and Apple Breeding	Ballard, 1916
197	30	Clover and Grass Seed Inspected in 1914	Smith, 1916
198	30	Wheat	Schmitz, 1916
199	30	Tests of the Value of Stable Manure, Commercial Fertilizer and Crimson Clover for Vegetable Crops	White, 1916
200*	30	Winter Oats, Barley, Spelt and Emmer	Schmitz, 1917

BULLETINS PUBLISHED BY THE UNIVERSITY OF MARYLAND AGRICULTURAL EXPERIMENT STATION.—Continued.

Bulletin No.	Annual Report No.	NAME OF BULLETIN	
201	30	Soy Beans	Schmitz, 1917
202	30	Timothy Fertilization and Culture	Schmitz, 1917
203*	30	Agricultural Seed Inspected in 1915	Smith, 1917
204	30	Variety Tests of Potatoes, Cabbage and Other Vegetables	White, 1917
205	30	Fumigation of Greenhouses	Corey, 1917
206	30	The Hothouse Milliped	Cory-O'Neill, 1917
207	30	Plum Growing in Maryland	Holmes, 1917
208	30	Tarsonemus Pallidus Banks, a Pest of Geraniums	Garman, 1917
209	31	The Oriental Peach Pest	Garman, 1917
210*	31	Agricultural Seed Inspected in 1916	Smith, 1918
211*	31	Strawberry Notes	Ballard, 1918
212	31	Physiological Basis for the Preparation of Potatoes for Seed	Appleman, 1918
213	31	The Control of House Flies by the Maggot Trap	Cory, 1918
214	31	Tests of an "All Crops Soil" Inoculum	Emerson, 1918
215	31	Fertilizing and Cultural Experiments with Irish Potatoes	White, 1918
216	31	Conditions Detrimental to Seed Production	Norton-Leathers, 1918
217	31	The Relation of Milk Yield to Age at First Calf	Towles, 1918
218*	31	Report of Nut Tree Investigations in Maryland	Johnson, 1918
219*	32	The Revised Agricultural Seed Law	Smith, 1918
220*	32	Agricultural Seed Inspected in 1917	Smith, 1918
221	32	An Accurate Method of Determining Which Hens Are Laying	Waite, 1918
222*	32	Experiments with Fertilizers on Greenhouse Crops	White, 1918
223	32	A Comparison of Several Species of Lepidoptera Infesting Peach and Apple Trees in Maryland, with Additional Notes on the Oriental Peach Moth	Garman, 1918
224	32	Seed Inspected in March and April, 1918	Smith, 1918
225	32	Fertilizer Experiments with Tobacco	Garner-Brown, 1919
226	32	How to Caponize	Waite, 1919
227	32	Citrus Fruit Rinds as a Hog Feed	Allen, 1919
228*	33	Growing Alfalfa in Maryland	Schmitz, 1919
229	33	Agricultural Seed Inspected in the Fall of 1918	Smith, 1919
230	33	Poultry Appliances and Methods	Waite, 1919
231	33	Field-Damaged Wheat for Poultry	Waite, 1919
232	33	Mushrooms	White, 1919
233	33	The Effect of Age of Eggs on Their Hatching Quality	Waite, 1919
234	33	Earthworms—The Important Factor in the Transmission of Gapes in Chickens	Waite, 1920
235	33	Capons Versus Cockerels	Waite, 1920
236	33	The Control of the Strawberry Leaf Bettle	Cory-Travers, 1920
237*	34	Variety Tests of Corn, Wheat and Soy Beans	Metzger-Eppley, 1920
238*	34	Seed Inspected for 1919	Holmes, 1920
239*	34	The Relation of Certain Greenhouse Pests to a Geranium Leaf Spot	Garman, 1920
240	34	Internal Fungous Parasites of Agriculture Seeds	Chen, 1920
241*	34	Annotated List of Halticini	Duckett, 1920
242*	34	The Comparative Value of Different Forms of Lime	McCall, 1921

BULLETINS PUBLISHED BY THE UNIVERSITY OF MARYLAND AGRICULTURAL EXPERIMENT STATION.—Continued.

Bulletin No.	Annual Report No.	NAME OF BULLETIN
243	34	Work of Seed Inspection Laboratory for the Year 1920 ... Holmes, 1921
244	35	Poultry Experiments, Observations, Notes and Plans .. Waite, 1921
245	35	The Seasonal March of the Climatic Conditions tions of a Greenhouse as Related to Plant Growth ... Johnson, 1921
246*	35	Garlic and Other Factors Influencing Grades of Wheat ... Metzger, 1922
247*	35	Fertilizers for Maryland Soils ... McCall, 1922
248*	35	Tomatoes for Marketing and Canning ... Jones, 1922
249*	35	Work of the Seed Inspection Laboratory for the Year 1921 ... Holmes, 1922
250*	35	The Influence of Various Systems of Grape Training on Fruit Production ... Auchter-Ballard, 1922
251*	36	Fertilier Variety and Seed Selection Experiments on Irish and Sweet Potatoes ... White, 1923
252	36	Experiments on the Control of the Woolly Aphis ... Cory, 1923
253*	36	Sweet Clover for Summer Pasture and Green Manure ... Metzger, 1923
254*	36	Forecasting the Date and Duration of the Best Canning Stage for Sweetcorn ... Appleman, 1923
255*	36	Moisture Relations of Peach Buds During Winter and Spring ... Johnston, 1923
256	37	Fruit-Rotting Sclerotinias ... Norton-Ezekiel-Jehle, 1923
257	37	Is There Normally a Cross Transfer of Foods, Water and Mineral Nutrients in Woody Plants? ... Auchter, 1923
258*	37	Changes in Quality and Chemical Composition of Parsnips Under Various Storage Conditions ... Boswell, 1923
259*	37	Some Studies in the Production of Double Blooms of Stocks (Mathiola Icana Annua) ... White, 1923
260*	37	The Effect of Heat Upon the Availability of the Phosphorus in Basic Phosphate Rock ... McCall-Wilhelm, 1923
261*	37	The Control of Truck Crop Pests by Dusting ... Cory-Potts, 1924
262	37	Spraying for Control of Diseases and Insects of the Apple ... Jehle-Cory, 1924
263	37	Dusting and Spraying Cantaloupes ... Jehle-Potts, 1924
264*	37	Control of the European Red Mite ... Hamilton, 1924
265	37	Potato Sprouts as an Index of Seed Value ... Appleman, 1924
266*	37	What Is the Value of a Ton of Stable Manure? Mc-Call-White, 1924
267	37	Some Chemical Aspects of Sweet Corn Drying ... Appleman, 1924
268*	38	Green-Manuring Crops for Soil Improvement ... McCall, 1924
269*	38	The Biology and Control of the Chrysanthemum Midge ... Hamilton, 1924
270*	38	Growth of Potato Plants in Sand Cultures Treated with the "Six Types" of Nutrient Solutions ... Johnston, 1924
271*	38	Fruit-Rotting Sclerotinias ... Ezekiel, 1924
272*	38	The Boxwood Leaf Miner ... Hamilton, 1925
273	38	The Maryland State Egg-Laying Competition and Performance Tests ... Waite-Leuschner, 1925

BULLETINS PUBLISHED BY THE UNIVERSITY OF MARYLAND AGRICULTURAL EXPERIMENT STATION.—Continued.

Bulletin No.	Annual Report No.	NAME OF BULLETIN
274	39	A Simple and Effective System of Management for the Control of Bacillary White Diarrhea......Waite, 1925
275*	39	Cropping Tests with Tobacco................Brown-Lunn, 1925
276*	39	A Study of Respiration in Potatoes, with Special Reference to Storage and Transportation....Kimbrough, 1925
277*	39	Soybeans ....Metzger-Holmes-Bierman, 1925
278*	39	The Budding and Grafting of Fruit Trees. Schrader-Whitehouse, 1925
279	39	The Maryland State Egg-Laying Competition and Performance Tests II................Waite-Leuschner, 1926
280*	39	Roadside Markets in Maryland...............DeVault-Bouis, 1926
281*	39	Variety Tests of Field Crops at Ridgely.....Metzger-White, 1926
282*	39	Disastrous Effect of Mosaic on the McCormick Potato..Jehle, 1926
283*	40	Pectic Constituents of Peaches and Their Relation to Softening of the Fruit........Appleman-Conrad, 1926
284*	40	Fruit-Rotting Sclerotinias..........................Ezekiel, 1926
285*	40	Agricultural Progress in a Typical Maryland Community ....Metzger, 1926
286*	40	The Concord Grape—Pruning and Chemical Studies in Relation to the Fruiting Habits of the Vine ....Schrader, 1926
287*	40	Soil Management Studies.............................McCall, 1926
288*	40	The Salt Requirement of Tobacco Grown in Sand Cultures ....Ho Liu, 1926
289*	40	The Relative Value of Different Carriers of Phosphorus ....McCall, 1926
290*	40	The Relation of Internal Cob Discoloration to Yield in Corn.................Jehle-Oldenburg-Temple, 1927
291*	41	The Pectic Constituents of Tomatoes......Appleman-Conrad, 1927
292*	41	The Phlox Plant Bug.....................Cory-McConnell, 1927
293*	41	Overrun and Dipping Losses of Ice Cream.........Bierman, 1927
294*	41	Fertilizer Ratios for Prince George County Soils....McCall, 1927
295*	41	Does Tile Drainage Pay?.........................McCall, 1927
296*	41	The Effect of Sulphur on Soils and on Crop Yields.McKibbin, 1927

---

*Publications marked with an asterisk are available for distribution.

A complete set of these copies will be found in the College Library either as separates or as a part of an Annual Report. Partially complete files may be found in the office libraries of the various departments of the College and Station.